

SCIENCE

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NOTES ON THE HABITS OF SOME COMMON ENGLISH SPIDERS.¹

SOME years ago I sent to *Nature* (vol. xxiii. p. 149) an account of the behavior of the common small garden-spider when a sounding tuning-fork is brought near. If the fork is made to touch any part of the web, or the twigs or leaves by which the web is supported, the trembling of the web completely deceives the spider; so that, after rapidly finding which radial line is most disturbed, she runs along this one and attempts to secure the tuning-fork. She fails to discover in the cold and polished steel any thing different from her usual food; or rather, being led by instinct to eat that which buzzes, she struggles in vain to find a soft place in the armor of her prey.

On the other hand, if the tuning-fork is brought near one of these little spiders while she is waiting in the centre of her web, she generally drops instantly, but will climb up again as quickly as possible if the vibrating fork is made to touch the web.

More recently Mr. and Mrs. Peckham, who have made an elaborate study of the mental powers of spiders (*Journal of Morphology*, vol. i. p. 383), have repeated these experiments, and have confirmed them in every essential particular.

They found that many geometrical spiders would drop when a vibrating tuning-fork was brought near them, but that after much teasing in this way they would sometimes learn to take no notice. They conclude that this dropping habit is of direct service to them in enabling them to escape from birds or wasps which prey upon them.

While staying recently with Mr. Romanes, in Ross-shire, I made some observations in this connection which are possibly worth recording.

The small geometrical spiders which abounded on the gorse bushes near the sea behaved as described above, while, as I have noticed many times before, the diadema spiders, which also were abundant, were affected in a totally different manner. If the tuning-fork is held near them, they throw up their four front legs, either perpendicularly or even farther back, and as soon as the fork is within reach strike at it so violently that the blow may be plainly heard. A buzzing insect carried near is caught by the diadema spider in this way, and speedily wound up.

There were a number also of small brown geometrical spiders, which I believe were young diademas: these dropped when a sounding tuning-fork was brought near them even more readily than the full-grown little spiders.

¹ From *Nature*.

Instead of bringing a tuning-fork near the spiders, I made a sudden and high-pitched shout, taking care that my breath should not complicate the situation. The effect, when a great number of spiders were resting on their webs near together, was sufficiently striking. The diademas threw up their legs simultaneously, and struck in the air at the imaginary insect; while the full-grown little spiders, and what I believed to be the young diademas, all dropped out of their webs into the branches below.

The suggestion of Mr. and Mrs. Peckham, that this habit is a protection against wasps, is made the more probable by the difference in the behavior of the full grown diadema, which would certainly not be afraid of a wasp, and the little spiders. However, the tactics of a wasp that I watched left no doubt in my mind that this explanation is correct. The wasp, when I first saw it on a gorse spray, was evidently intent on something. It ran up the spray until it came to the silken tube in which the little spider dwells when not on the web. The spider retreated farther into the tube, while the wasp was struggling among the spines and the silk to dislodge her. After a short time the wasp gave up the attempt, and flew away for a few yards. It then very suddenly darted at another spider, seized her before she had time to drop, and carried her off to a branch close by. This was done so quickly that I could not follow the details of the attack; but it is certain that the wasp, which did not carry a spider a moment before, had, without alighting, taken the spider off her web. It would appear that the dropping habit of the spider has re-acted on the wasp, and has developed in it a speed of attack sufficient to counteract the spider's only means of escape.

I have not found that the little spider is less attracted by low notes than by high. A variety of forks, forceps from a box of chemical weights, or a carpenter's square banged on the knee, all seemed to deceive her equally well; but a vibration of great amplitude causes her to retreat to a place of safety. The spider seems to judge of the necessity for prudence by the violence of the insect rather than by the natural note of its wings. She is terrified by a heated tuning-fork which is not too hot to hold.

Mr. and Mrs. Peckham have formed a low estimate of the spider's intelligence as distinct from instinct. They found that a spider which has the habit of carrying its cocoon was quite satisfied with a lead shot slipped into the silk covering of the eggs, and laboriously carried it about. The following are a few of many experiments which I have made, which lead to the same conclusion. A large diadema which had just caught and wound up a large fly, and had carried it up to

its retreat, left it hanging by a short line, while she proceeded, according to the usual habit of this kind of spider, to carefully clean herself before the meal. Meanwhile I managed to replace the fly by a piece of cork without disturbing the spider. When the toilet was complete, she pulled up the line from which the supposed fly was suspended, and tried to eat the cork. She was a long time trying every part of the cork before she finally let it drop. A piece of an india-rubber ring was twisted up until it had acquired a state (well known to school-boys) of spasmodic recoil. This was placed on the carpet-like web of a large black house-spider, which Mr. Pocock tells me is known to naturalists as *Tegenaria atrica*. These, like other house-spiders, appear to be far more wary than the geometrical sort. The india-rubber was made to move slightly by being pinched from below, and then the spider pounced upon it. I did not allow the spider to carry it off, but made it seem to struggle and resist by manipulation with a pair of forceps under the web. The spider became more and more desperate, and at last, when the web was much damaged by the battle, I dragged the rubber away; but the spider could not allow this, and clambering through the hole made in the web, and hanging by her fourth pair of legs, seized the escaping insect. I then let go, and the spider carried the piece of india-rubber away to her den, perfectly satisfied. However, she did not seem to appreciate her meal, for, after biting it on every side, she was obliged to take it to the edge of her web and drop it. I then picked it up, and was surprised to find the spider willing to be similarly deceived again.

These spiders will come to a tuning-fork once or twice perhaps, but the moment they touch it they fly terrified, as they do from a common bluebottle with mica on its wings. They seem generally thirsty, and will drink water placed upon the web; and if it is scattered in drops, they are able to find the drops, but by what process I do not know. The diademas, too, especially when old, and only able to mend old webs, not to spin new ones, are always ready to drink. They will hold a piece of wheat straw six or eight inches long which has a drop of water upon it until they have drunk the water; but while the little spider is so insensitive in taste as not to entirely reject a fly that has been soaking in a paraffine lamp, especially if it is made to buzz with a tuning-fork, the diadema has a strong objection to alcohol, even well diluted, and rubs her mouth against any thing near by after tasting it, so as to get rid as quickly as possible of the noxious fluid. Is it possible that the numerous spiders which are found in secondary batteries have been killed by the acid when attempting to drink, or are they destroyed by accidentally meeting the acid in their ordinary descents? The *Tegenaria* is aware of the shout which causes the diadema to strike and the little spider to drop, but the effect is a jump such as is executed by any one when suddenly startled.

It would appear that the only sense which is developed to any extent, and that most marvellously, is the sense of touch; hearing, taste, and smell to a small degree; but sight, as we understand the term, in spite of their numerous eyes, seems to be absent. The *Tegenaria* will stand within half an inch of a fly feigning death, without being able to find it; while the geometrical spiders, under like circumstances,

gently pluck line by line until the effect of the inertia (not weight) of a motionless object guides them to the proper place.

These remarks do not apply to the hunting spiders.

C. V. BOYS.

THE PRODUCTION OF IMMUNITY FROM DISEASE.

A RECENT despatch to the newspapers stated that Koch's consumption "lymph" had been analyzed by a Vienna doctor, and that the principal ingredient was found to be a substance which the chemists know as albumose. Professor Koch himself, in his articles to the medical papers, does not give the method of preparation of the "lymph," but indicates that the material used is a sterilized culture liquid of the germ that causes tuberculosis.

This being the case, it is of interest to call attention to the fact that the principle which Professor Koch is applying received its first proof in a study of the fatal disease of hogs, known as hog-cholera, made by Drs. Salmon and Smith of the Bureau of Animal Industry, Department of Agriculture, Washington, D.C., in 1887. To explain clearly what has been done, it is a well-known fact that the germs which cause different diseases in men and animals can be isolated, and caused to multiply artificially outside of the body, by supplying them with food. Some germs require one sort of material, others a different one; but in general it may be said that beef-broth, or blood serum, or glycerine and gelatine, are the most useful substances. These prepared solutions are called culture liquids, or culture media. Into a tube or flask of the liquid are introduced a few of the germs it is desired to cultivate, and in a short time the germs are found to have increased so enormously that they can be seen by the naked eye. During this time great changes have taken place in the culture solutions: what was at first harmless beef-broth has been changed by the action of the germ to a liquid, which, after the germs have been removed by filtration or killed by heat, still contains poisonous alkaloids and albuminoids, which are generally fatal in their effects upon the animal body. Alkaloids formed in this way are called ptomaines; and the albuminoid bodies, albumoses; and each distinct disease-germ forms a peculiar and distinct ptomaine and albumose. The growth of the germ in the body is supposed to form ptomaines and albumoses from the blood and tissues, and these substances cause the fatal effects of the different diseases.

A horse can be gradually accustomed to arsenic; a man, to opium, nicotine, strychnine, and quinia: so that after a time a dose which would at first have been fatal to him can be taken without injury. The idea suggests itself at once, why not prepare and isolate the poisonous substances which germs form, give them in small doses to men and animals, thus gradually accustoming the body to their effect; and if then the disease-germ afterwards enters the body, the system will be already fortified against the poison which is produced, and able to resist what would otherwise be its bad effects.

This is exactly what Dr. E. A. v. Schweinitz, physiological chemist in the Department of Agriculture at Washington, D.C., has done in the case of the two diseases of hogs which cause such enormous losses to the farmers of the country; viz., hog-cholera and swine-plague. Dr. Schweinitz has made

considerable quantities of culture media, and by chemical methods isolated and extracted the ptomaines and albumoses that the germs form.

These poisonous liquids have been injected into guinea-pigs, and the animals then inoculated with the virus of the disease. The guinea-pigs which had thus been treated were not seriously affected by the virus, while the guinea-pigs which had not been treated by injecting the remedy invariably died. Both swine-plague and hog-cholera have thus been prevented in guinea-pigs, which are very susceptible to the diseases.

Some experiments have also been made upon hogs, which have been fairly successful; and there is every reason to expect that this method of treatment can shortly be applied on a practical scale. It may be mentioned that the scientific results of these experiments were published in the *Philadelphia Medical News* of September and October, 1890.

While Professor Koch has been working for the benefit of mankind, the secretary of agriculture of the United States has had the pecuniary interests of the farmer and the safety of animals at heart in encouraging this difficult line of investigation; and results have been secured which are far-reaching in their importance and application for men as well as animals.

Professor Koch, in treating consumption, uses a solution the composition of which he says he does not know. The Department of Agriculture uses substances which are obtained in a solid form, as most drugs, and prepares solutions of any desired strength for treating the diseases of hog-cholera and swine-plague.

There is no reason why this line of research should not be pushed with reference to many diseases of men and animals in the large universities and laboratories of our own country. In the hands of competent investigators, there can be secured in the United States the most important results, and great discoveries can be made. The Scientific Department of the government has shown the way. Let others follow.

SPECIAL PLANTING FOR HONEY.

It is a well-known fact, and as thoroughly appreciated by the thoughtful bee-keeper, that often, because of some peculiar condition of the weather, even our best honey-plants fail to secrete nectar. In Michigan the years 1888 and 1890, and to a less degree 1889, gave excellent illustration of this fact in respect to white clover.

Again, it frequently occurs that a drouth or over-production the previous season so weakens plants that they do not develop to the blossoming stage, or do not produce blossoms. This very season, 1890, gave us almost no basswood bloom. The same truth is illustrated not infrequently by almost all of our nectar-secreting plants.

Once more, there are times in every season and region when there is a dearth of nectar-secreting flowers. In Michigan this period comes about July and August, usually from about July 15 to Aug. 15. At this season there are neither native honey-plants in bloom, nor are there honey-plants in cultivation. So at this season the bees are idle, and robbing is a common occurrence.

For the above reasons bee keepers are much interested to know if there are plants that will always secrete nectar irrespective of weather,—plants that will secrete not simply enough to attract bees, but enough to give a surplus and insure a profit. They are also practically interested in knowing whether or not there are plants that will secrete so liberally that it will pay to grow them for honey alone. It is further a matter of importance to find if there are plants that bloom at the time of the honey-dearth in

July and August, and so, valuable to grow, either for honey alone or for honey and other purposes. There are always more or less waste places, by roadsides, along railways, etc., near by most apiaries. It is important to know if it will pay to utilize such by planting for honey, and, if so, to know what to plant.

That these are important matters for investigation is clear from the fact that many bee-keepers have spent considerable sums in trying to solve these questions.

It is clear, that, to arrive at any definite and reliable conclusions, experiments must be tried on a large scale. We must not see simply that bees work on the flowers, but we must get results. We must be assured that the bees actually store, and that in paying quantities.

It occurred to me, and to the board of our Michigan experiment station, that this was a very proper subject for investigation at our station, and so for the past two seasons we have devoted about fourteen acres to this purpose. The seasons have been very opportune, as there was an almost total failure in the honey-harvest both years; and so, if any plan adopted was a success, it would have ample chance to prove its excellence.

I decided to try the three following honey-plants: Rocky Mountain bee-plant (*Cleome integrifolia*), Chapman honey-plant (*Echinops spherocephalus*), and a foreign mint of the genus *Melissa*. I hoped to find a plant that would secrete nectar every year, especially in times of drouth, that would grow with little or no care on the part of the bee-keeper, and would yield bountifully of nectar. As the Chapman honey-plant was loudly praised, and was reported a success upon actual trial, and as the seed had been distributed by the government, it occurred to me that it should be one of the plants first tested. The Rocky Mountain bee plant flourishes on the dry plains of Colorado, where it is said to give prodigious yields of nectar; and as I had been quite successful in growing it in small plats for years, where it seemed to attract the bees from early July till frost, I looked upon that plant as well worthy a trial. This plant is also reported as growing wild in Wisconsin and Minnesota, and as affording much nectar. The *Melissa* belongs to the mint family,—a family of honey-plants,—is strongly praised by those who have tried it, and who have no pecuniary interest in its becoming popular: so I concluded to make it third in the list to be adopted.

The Chapman Honey-Plant.

I have planted, in all, four or five acres of the seed of this plant, some on clay and others on sand. When the seed came, the plants made a very vigorous growth, but did not blossom at all the first year. Thus the plant is a biennial. No nectar can be secured from it until the second year after planting. The plant looks like a thistle, the spines doubtless suggesting the generic name *Echinops*. The flowers form a very perfect globe or sphere; hence the specific name *spherocephalus* is very appropriate. The plant, if cultivated till once well started, will care for itself, as it is very vigorous. It begins to bloom here at the Michigan Agricultural College about the middle of July, and continues to blossom till the middle of August. The blossoms commence to open at the lower margin of the head, and continue to open towards the centre. The seasons have been very dry, yet the bees visited the *Echinops* very freely, and secured considerable honey; and this, too, just at the most desirable period of the year.

A very serious objection to the general adoption of this plant is the difficulty of securing the seed. The chaff has barbed awns, that are very minute. These fly everywhere as we clean the seed, and, except one is protected better than he will be unless previously taught by experience, these awns are sure to enter the eyes and pierce the skin at every possible opportunity. The effect of this is almost maddening. For three or four days the pain in the wounded eyes and skin is almost unendurable.

After the plants bear a full crop of seed they seem exhausted, and very few survive to blossom the second year. Our plants in 1889 were wonderfully fine and vigorous: the plants on the same area this year are very few and scattering. To be sure, young plants have come up thickly from seed, but they will bear no bloom till 1891. Thus we see that we cannot grow this plant profitably except as we plant, or permit it to self-plant, every

year, and also that we get no honey till the second season from the seed.

Another serious difficulty is the chance that the seeds may not come. I planted five acres of seed this spring. The seed seemed excellent, the ground was in fine condition, and we had frequent and abundant rains; yet so few of the seeds came, that I ploughed all up, and sowed to buckwheat.

We see, then, that the special planting for honey alone, of the *Echinops*, is not encouraging. The fact that the plant is a biennial, that it is so terrible to thresh, that the seed is likely to fail to germinate, and the fact, if we may judge from analogy, that the plant may not always secrete nectar even though it bloom profusely (our experiments do not prove or refute this point),—all would tend to make the wise bee-keeper hesitate before he grew this plant. It seems more than probable that it will never pay to do so.

The Rocky Mountain Bee-Plant.

I had previously learned that to grow *Cleome* we must plant in autumn. Spring-sown seed will rarely germinate. So in the fall of 1888 I sowed eight acres of *Cleome*. The seed was procured fresh from Colorado. To my great disappointment, the seed did not germinate well. In many places the plants were exceedingly scattering. These plants were on sandy land. Other seed was planted on clay, and did not germinate nearly as well as that sown on sand. The blossoms commenced to open the first of July, and continued to bloom even into September. The season was very dry, the excessive drouth reaching from July till late autumn,—just the time for a Colorado plant to show its virtues. The plant grows from one to three feet high, the foliage is smooth, the leaves compound, and the flower an umbel. The flowerets commence to open below, and continue for a long time.

To my great disappointment, the flowers seemed to furnish very little nectar. The bees worked on the plants only occasionally, and then not excessively. Thus there were two disappointments,—failure of the seeds to germinate, and failure of the flowers to secrete.

We sowed in 1889 three acres with seed of our own raising, which failed almost entirely to germinate. We left three acres uncultivated where the plants were thickest in 1889, to see if the plants would self-seed the ground. Here, too, we were disappointed. There were so few plants, even though the season seemed exceptionally favorable, that both pieces—the one planted and the one supposed self-sown—were ploughed up.

Thus these plants, like the *Echinops*, two as promising species as we could hope to find, promise little in the way of special planting exclusively for honey. The expense and labor; the doubt of growing a crop even though we plant; the chance that the season may not be propitious, and so there be little or no nectar secreted, even though the plants do grow and bloom,—all this makes the prospects for profit in such planting not encouraging.

Melissa.

The *Melissa* is an annual. We planted it for two successive years. It did well, blossomed freely, and was visited very generally by the bees. It grows well on both sand and clay, and, by sowing early, will commence to bloom early in July, and continue in bloom for a month or more. I regret to say that it will not self-seed, and must be planted annually. This is expensive, and it is doubtful if it will pay. It is to be said, however, that *Melissa*, in common with the other mints, seems to attract the bees at all times of bloom, whatever the season: so I am of the opinion, that, if any plant will pay exclusively as a honey-plant, it will be some mint. Many of these are perennial. As the three acres of *Melissa* last season were singing with bees all through the time of blossoming, and as our bees swarmed in early August, a thing unprecedented in Michigan, it gives reason to hope, that, with a large average, we might secure a honey-crop each year despite the season.

Thus I believe our experiments indicate that special planting for honey alone is of doubtful practicability; that *Echinops* and *Cleome*, at least, are not the plants for such special planting, if it

is ever to be a success; and that while *Melissa*, or bee-balm, is not profitable, as it is an annual, it is possible that the perennial mints are the plants, if any such there be, that will pay us to grow exclusively as honey-plants.

Unless *Cleome* will seed itself, it is not the plant even for way-side planting. I think we must look to some of the persistent mints, or, more probably, to some plant valuable for other purposes even, to plant on the roadside and in waste places.

I hope next to try *Melilot*, or sweet clover, not so much to find whether it is a valuable honey-plant, as we know that now, but rather to find if this luxuriant and vigorous clover may not have other important uses, possibly for silage. I shall also hope to plant small beds of promising mints, in hopes for hints of some plant that will pay just for nectar, and nothing else.

A. J. COOK.

THE RELATION OF GROUND WATER TO DISEASE.

AT the meeting this year of the Royal Meteorological Society, held on Nov. 19, the president, Mr. Baldwin Latham, delivered an address on the above subject.

The pages of history show that when the ground waters of our own or other countries have arrived at a considerable degree of lowness, as evidenced by the failure of springs and the drying-up of rivers, such periods have always been accompanied or followed by epidemic disease. In all probability, ground water in itself, except under conditions where it is liable to pollution, has no material effect in producing or spreading disease. As a rule, it is only in those places in which there has been a considerable amount of impurity stored in the soil that diseases become manifest; and the most common modes by which diseases are, in all probability, disseminated, are by means of the water-supplies drawn from the ground, or by the elimination of ground air into the habitations of the people. It is found that the periods of low and high water mark those epochs when certain organic changes are taking place in the impurities stored in the ground, which ultimately become the cause, and lead to the spread, of disease. Mr. Latham defines "ground water" as all water found in the surface soil of the earth's crust, except such as may be in combination with the materials forming the crust of the earth. It is usually derived from rainfall by percolation, and it is also produced by condensation. In dry countries, ground water is principally supplied by the infiltration from rivers, as, for example, in the Delta of the Nile.

The absence of water passing into the ground for a long period, naturally leads to the lowering of the free ground water-line, and may lead to the drying of the ground above the water-line; and it is curious to note, with reference to small-pox, that the periods marking the epochs of this disease are those in which there has been a long absence of percolation, and a consequent drying of the ground preceding such epidemics. On the other hand, small-pox is unknown at such periods as when the ground has never been allowed to dry, or is receiving moisture by condensation or capillarity.

The study of underground water shows that certain diseases are more rife when waters are high in the ground, and others when the water is low. The conditions that bring about and accompany low water, however, have by far the most potential influence on health, as all low-water years are, without exception, unhealthy. As a rule, the years of high water are usually healthy, except, as often happens, when high water follows immediately upon marked low water, when, on the rise of the water, an unhealthy period invariably follows.

Mr. Latham has found that those districts which draw their water-supplies direct from the ground are usually more subject to epidemics and disease than those districts in which the water-supply is drawn from rivers supplied from more extended areas, or from sources not liable to underground pollution. In the case of Croydon, one portion of the district (under three-fourths) is supplied with water taken direct from the ground, whilst the remaining portion is supplied with water from the river Thames. It is curious to note, that, even so recently as 1885, the zymotic death-rate in the districts supplied with underground water was twice as great as in that part of the district supplied from the Thames; and

in this particular year 41 deaths from small-pox occurred in the district, not one of which was recorded outside the district supplied by the underground water.

Mr. Latham, in his address, dealt largely with zymotic diseases as affected by ground water, and showed that cholera ordinarily breaks out when there is the least ground water; a high air and ground temperature is also necessary for its development; and, as a rule, the low-lying districts are favorable to the production of these high temperatures. Small-pox is almost always preceded by a long period of dryness of the ground, as measured by the absence of percolation. Typhoid-fever is most prevalent after a dry period, and the first wetting of the ground or percolation from any cause takes place. The condition essential to the development of diphtheria is a damp state of the ground marked by extreme sensitiveness to percolation of rain. Scarlet-fever follows the state of the dryness of the ground which is essential for its development, and it occurs in the percolation period. The conditions that precede small-pox are those favorable for the development of scarlet-fever, and, like small-pox, the dampness of the ground for any considerable period in any particular locality may check its development or render it less virulent, and it is most rife in low-water years. Measles are least prevalent at the low-water periods, and mostly rife at and near high-water periods. Whooping-cough follows the percolation period in its incidence, increasing with percolation, and diminishing as the waters in the ground subside. Diarrhœa is generally more prevalent in a low-water year than in other years; that is, with a very much colder temperature in a low-water year there is a very much higher death-rate from this disease.

Mr. Latham finds that the general death-rate of a district is amenable to the state of the ground water, years of drought and low water being always the most unhealthy.

HEALTH MATTERS.

A Faster in the Seventeenth Century.

Now that Succi, the Italian fasting man, is attracting universal attention, it may be interesting to recall a case of total abstinence from food for forty days, which occurred more than two centuries ago. In the winter of 1684, according to *The Hospital*, a certain Isaac Henry Stiphont of Haarlem was confined in a lunatic-asylum. At this date he was forty years old, and, although born of an insane mother, had learned a handicraft, married, and conducted himself like other people, until, in the previous autumn, he quarrelled with his brother-in-law, and in a scuffle accidentally broke the man's leg, when the fear of falling into the hands of justice drove him mad. He had been in the asylum a few months, when he suddenly took it into his head that he was the Messiah, and resolved to fast forty days and forty nights. Accordingly, on Dec. 6 he began to abstain from all food, and continued to do so until Jan. 15, 1685. During all this time he took no sustenance whatever. Nothing passed his lips but an occasional sip of water for the purpose of cleansing his mouth. If a little broth or brandy was put into the water, he discovered the addition instantly, and thrust the cup away untasted. Every effort was made to persuade or compel him to take food. It was even sought to influence him by the pretended apparition of an angel, who brought to him the express command of God that he should eat. He does not appear to have doubted the reality of the visitation, but continued to declare that it was the will of his heavenly Father that he should fast forty days and forty nights. Stiphont had been a smoker before the commencement of his fast, and continued the daily use of tobacco during the whole time of his abstinence from food. The case had excited great interest, and when the fast was ended the doctors desired the man to take some medicine to stimulate the action of the stomach. He refused, and would only take fish and a special soup to be prepared by his wife. So singular an occurrence made a great noise at the time. Some people ascribed it to a miracle, others to the combined effect of madness and tobacco. A madman, it was said, could endure a temperature that froze his companions; so, if insanity made a man impervious to cold, why should it not render him insensible to hunger? The wild hordes of Canada were known, during times of scarcity, to

exist for weeks upon water and tobacco, so why should not Stiphont, the civilized, do the same by the help of his madness?

Deafness for High Notes.

We learn from the *Medical Record* of Nov. 29 that Mr. Edwin Cowles, editor of the *Cleveland Leader*, who died last March, had a peculiar form of deafness. He never heard the sound of a bird's note, and until he grew to manhood he always thought the music of the bird was a poetical fiction. "You may fill the room with canary birds," he once said, "and they may all sing at once, and I would never hear a note, but I would hear the fluttering of their wings. I never heard the hissing sound in the human voice: consequently, not knowing of the existence of that sound, I grew up to manhood without ever making it in my speech. A portion of the consonants I never hear, yet I can hear all the vowels. About a quarter of the sounds in the human voice I never hear, and I have to watch the motion of the lips and be governed by the sense of the remarks, in order to understand what is said to me. I have walked by the side of a policeman going home at night, and seen him blow his whistle, and I never could hear it, although it could be heard by others half a mile away. I never heard the upper notes of the piano, violin, or other musical instruments, although I would hear all the lower notes."

Summer Drinks.

The *Medical Record* of Calcutta contains some interesting remarks upon the beneficial effects to be derived from non-alcoholic drinks in the height of summer, says the *Lancet*. After remarking that the very bane of European existence in India lies in the habits of eating and drinking, physiological arguments are adduced to show that highly carbonized materials are very deleterious in hot climates. The custom of the Moguls, who for luxury have had no equal in Indian history, is referred to as offering a fitting example. Their drinks consisted of milk, sweetened waters, or sherbets prepared from sub acid fruits, such as lemons, tamarinds, pomegranates, etc., flavored with rose or Keora essences, date-juice, numerous vegetable tisanes, and some infusions of glutinous seeds flavored with sugar and essential oils. These were often cooled with ice collected in pits, where it was stored during the winter months. The Oriental races, it is asserted, suffer from few of the diseases which are common to the copious meat-eating, wine-drinking Europeans. For a hot day, a light vegetable diet is recommended, with a spare quantity of meat food and an abundance of cooling, non-alcoholic drinks. Ice is regarded as a necessity, and coffee, tea, and cocoa are to take the place of whiskey-and-soda. The use of aerated waters, prepared from pure and wholesome ingredients, and the admixture in them of the numerous fruit flavorings which abound in the tropics, are regarded with favor, as likely to offer a lucrative source of income to persons engaged in such trade, while also giving the European community a very acceptable form of summer drinks.

Antiseptics among the Ancient Greeks.

Professor Anagostakis of Athens has published some interesting facts in reference to the employment of antiseptic measures among the ancient Greeks, as we learn from the *Druggists' Circular*. Hippocrates and Galen were aware that an unclean condition of wounds retarded healing. They were also well acquainted with the fact that by thorough hæmostasis, suture, and the employment of antiseptic measures, infection of wounds might be prevented. Hippocrates warned his disciples against the use of moist dressings, on account of the danger of suppuration, and forbade the employment of drugs before the wound was dry. Above all, says Galen, avoid dirt, as it prevents healing. The ancient Greeks boiled their water before applying it to wounds. Sponges were avoided, and charpie recommended in their stead, which was to be destroyed after use. One of the principal antiseptic substances then in use was wine, which was usually heated before using, and with which, according to Hippocrates, all wounds were to be washed. Dressings dipped in wine were also applied to the wound. Salt was in very general use, either in solution or in the form of seawater. The solutions were rendered aseptic by boiling. Sulphate of copper was relied upon as an antiseptic for foul wounds, and

was also put into use as a hæmostatic. Tar was highly praised for its antiseptic virtues, and was either applied in the form of a dressing or directly poured upon the wound. Besides these, many aromatics and bitters were in daily usage, among which were thyme, rosin, asphaltum, etc., used as dressings or in the form of plasters. Galen was acquainted with catgut, and advised the use of non-putrefying substances for sutures. Professor Anagostakis declares that all this was not empiricism, but an antiseptic method founded upon some knowledge of the principles governing the healing of wounds.

NOTES AND NEWS.

At the meeting of the American Naturalists, Dec. 31, 1890, at Boston, the topic will be "The Inheritance of Acquired Characteristics." It will be presented from several points of view by the following speakers: Professor H. F. Osborn, W. H. Brewer, W. K. Brooks, W. G. Farlow.

—From the first of January, Dr. Richard Andree, 27 Leopoldstrasse, Heidelberg, will be the editor of *Globus*, which was founded nearly thirty years ago by his father, recently deceased.

—A quaint custom, dating back to Anglo-Saxon times, known as payment of "wrath silver," was recently observed at Knightlow Hill, a tumulus between Rugby and Coventry, England. It consists of tribute payable by certain parishes in Warwickshire to the Duke of Buccleuch. The silver has to be deposited at daybreak in a hollow stone by representatives of the parishes, the penalty for default being forfeiture of a white bull with a red nose and ears. The representatives afterwards dined together at the duke's expense.

—In the *Meteorologische Zeitschrift* for October, M. Nils Ekholm gives an account of a method on trial at the Meteorological Office of Stockholm, which seems likely to throw some light upon what has hitherto been a difficult matter to deal with; namely, the determination of the path taken by storms. He calculates, from the telegraphic weather reports, tables of the density of the atmosphere, and constructs from the data synoptic charts of this element, and finds that they give a better clew to the movements and origin of cyclones than the usual method of a comparison of the isobars and isotherms alone. He finds, as stated in *Nature*, that storms move in the direction of the warmest and dampest air, parallel to the lines of equal density, leaving the rarer air to the right hand. A few empirical rules are quoted from about a hundred cases which have been investigated.

—Ginn & Co. announce to be ready Dec. 20, "Good-Night Poetry," by Mr. W. P. Garrison. The idea of this book is that "the thoughts and feelings that are in the mind as it bids the world good-night have the hours that follow for undisturbed working on the quality of the brain. For moral culture, these last minutes are decisive. We must gain them for what is true and good; and poetry is the voice they will hear most willingly."

—At the eighth congress of the American Ornithologists' Union, held at the United States National Museum, Washington, Nov. 18–20, the papers read were as follows: "The American Ornithologists' Union—A Seven Years' Retrospect," an address by the retiring president, by J. A. Allen; "Seed-Planting by Birds," by Walter B. Barrows; "Phalaropes at Swampscott, Mass.," by William A. Jeffries; "The Birds of Andros Island, Bahamas," by John I. Northrop; "Remarks on a Few Species of Andros Island Birds, collected by Dr. Northrop," by J. A. Allen; "An Experimental Trial of a New Method for the Study of Bird-Migration," by Harry Gordon White; "A Study of Bird-Waves in the Delaware Valley during the Spring Migration of 1890," by Witmer Stone; "Our Present Knowledge of the Neotropical Avifauna," by Frank M. Chapman; "The case of *Colaptes auratus* and *C. cafer*," by J. A. Allen; "Observations upon the Classification of the United States Accipitres, based upon a Study of their Osteology," by R. W. Shufeldt; "Some Observations on the Breeding of *Dendroica vigorsii* at Raleigh, N.C.," by C. S. Brimley; "The Trans-Appalachian Movement of Birds from the Interior to the South Atlantic States, viewed Chiefly from the Standpoint of Chester County, S.C.," by Leverett M. Loomis; "A Further Review of the Avian Fauna of Chester County, S.C.," by Leverett M. Loomis; "Some

Bird Skeletons from Guadalupe Island," by Frederic A. Lucas; "The Present Status of the Ivory-billed Woodpecker," by E. M. Hasbrouck; "Some Notes concerning the Evening Grosbeak," by Amos W. Butler; "Owls of Illinois," by W. S. Strode; "The Spring Migration of the Red Phalarope, *Crymophilus fulicarius*," by Harry Gordon White; "On the Tongue of Humming-Birds," by Frederic A. Lucas; "Instinct, Intuition, and Intelligence," by C. F. Amery; "The Habits of the American Golden Plover in Massachusetts," by George H. Mackay; "Correction to Revised Catalogue of the Birds of Kansas," by N. S. Goss; "Second Occurrence of the White-Faced Glossy Ibis, *Plegadis Guarauna*, in Kansas," by N. S. Goss; and "Remarks on the Primary Faunal Divisions of North America," by C. Hart Merriam.

—*The Scottish Geographical Magazine* for November is authority for the statement that a submerged city has been discovered between Grado and Pola in Istria, which very likely will prove to be the ruins of the town of Cissa, mentioned by Pliny and Decimus Secundinus as situated upon an island of the same name. The position of its site being doubtful, considerable interest has frequently been evoked by attempts to identify it, which, however, have hitherto failed. A diver who has examined the newly discovered remains reports that the walls of buildings and streets can be clearly traced, and that he followed a sea-wall for a hundred feet, and might have been able to proceed along it for a greater distance had not the apparatus which supplied him with air prevented his further progress, while the depth of water beyond the wall forbade any attempt to examine its frontage. No signs of doors or windows were observed; but these, he considered, were blocked up and hidden by *débris* and marine growths. Further investigations are to be carried out, which, it is hoped, will do much to clear up the mystery that has so long hung over Cissa, its position, and its fate.

—Mr. T. Tuhlin has recently published in the *Nova Acta* of the Royal Society of Sciences of Upsala a paper on the nocturnal temperature of the air at different heights up to twenty-four feet, from hourly observations taken during the winters of 1887 and 1888, in the grounds of the Upsala Observatory. The observations were made mostly while snow lay upon the ground, with thermometers both with and without screens, and were intended to form a sequel to the series made by Mr. H. E. Hamberg during the summer season. The first part of the paper, according to *Nature* of Nov. 20, contains a *résumé* of the experiments made since 1778. The following are some of the chief results arrived at in the second part of the paper. The decrease of temperature by radiation from unprotected thermometers over snow remained almost constant at heights above half a metre. During clear nights the temperature increased with height, from two or three hours before sunset until two hours after sunrise; and the lower the temperature, the greater was the increase. During cloudy or foggy nights the temperatures at different heights were nearly equal; but, if the clouds were high and thin, the increase of temperature with height was only slightly hindered. The surface of the snow was found to be colder than the surrounding air.

—The movement for better roads which is so prevalent in many States has resulted in Pennsylvania in the appointment of a road commission by the legislature and governor, to investigate the road laws and formulate a better system. With the same end in view, the committee on better roads, a committee of citizens of Philadelphia, offered, through the University of Pennsylvania, prizes amounting to \$700, for the best papers on road making and maintenance, embodying the engineering, economic, and legislative features of the problem. A large number of contributions were received and referred by Dr. William Pepper, provost of the university, to a board of adjudicators appointed by him, composed of Alexander J. Cassatt, C.E., chairman; William Sellers, M.E.; Joseph M. Wilson, C.E.; William H. Wahl, Ph.D.; Thomas M. Cleeman, C.E.; Hon. Wayne MacVeagh; and Professor Lewis M. Haupt, C.E., secretary. During the examination of the papers, and until the awards were made, their authors remained entirely unknown to the board, which, after due consideration, awarded the first prize, of \$400, to Henry Irwin, B.S., C.E., assistant engineer Canadian Pacific Railway, Montreal, Canada; the second

prize, of \$200, to David H. Bergey, B.Sc., M.D., North Wales, Penn.; and the third prize, of \$100, to James Bradford Olcott, practitioner and writer upon the subject, South Manchester, Conn.; and honorable mention, without reference to order, to Edwin Satterthwait (president of the Cheltenham and Willow Grove Turnpike Company, Jenkintown, Penn.), Charles Punchard (former surveyor of roads in England, Philadelphia, Penn.), George B. Fleece, C.E. (Memphis, Tenn.), Frank Cawley, B.S. (instructor in engineering, Swarthmore, Penn.), and Francis Fuller McKenzie, C.E. (Germantown, Penn.). These, together with a careful digest of the remaining papers prepared by Professor Lewis M. Haupt, C.E., head of the civil-engineering department of the university, and secretary of the committee on better roads, and a short paper, also written by him, discussing the general features of the contributions, with some notes on the adaptation of soils to foundations (all of which has been copyrighted by William H. Rhawn, chairman of the committee), will be published in one volume by Henry Carey Baird & Co., Philadelphia.

—*The Canadian Gazette* of Aug. 7, 1890, states that Sable Island is disappearing. This island, which lies in latitude 44° north, and longitude 60° west, was not very long ago forty-miles long, whereas it is now only twenty miles. Since 1880 three lighthouses have been built on it, of which two have been washed away, and the third is being rapidly undermined by the waves.

—Two great authorities on social matters have lately expressed their personal opinion on the results of modern education as to its effects upon the well-being of the population. Prince Bismarck thinks that higher education for the lower classes has been too widely spread (*British Medical Journal*), and in a recent conversation is reported to have said, "Over-education in Germany leads to much disappointment and dissatisfaction; in Russia, to disaffection and conspiracy. Ten times as many young people are educated there for the higher walks of life as there are places to give them, or opportunities for them, in the liberal professions, to earn a decent living, far less wealth and distinction. Perhaps it is not quite the right kind of learning, too. What good does it do them? When they have gone through it, in nine cases out of ten there is nothing for them to do; and their learning is worse than a superfluity to them, for it makes them discontented, nay, miserable." Mr. Gladstone takes a different view, but believes that classical education should only be given to those likely to profit by it in after-life. He is strongly desirous to promote physical and corporal education generally, and attaches much value to the training of the eye and the hand. For this purpose he urges that some branch of natural history should have a higher place in the modern theories of education than it has yet obtained. In these days, when many medical men see reason to believe that education in too many cases exhausts and injures the nervous system, in place of developing and strengthening it, it is interesting to know the opinion of great statesmen of experience. The question is a very serious one, and demands inquiry as to the effects of the present educational systems upon the brains of the young.

—A report has lately been issued by the Chinese commissioner of customs at Newchwang, as stated in *The Scottish Geographical Magazine* for November, in which some interesting particulars are given regarding the means of transport existing in Manchuria. The roads are mere tracks of frozen mud, impassable in wet weather. The late harvest has been exceedingly abundant, and peas, beans, and oil have poured into Newchwang, as many as two thousand carts arriving daily when the tracks were hard-frozen, and about one thousand per day when the roads were in a less favorable state for traffic. The smaller carts are drawn by a cow with a couple of donkeys in the traces, and carry a load of sixteen piculs (a little over 113 pounds). Medium-sized carts are drawn by five animals, and can make a journey of four or five days with a load of thirty-three piculs. The largest carts are dragged along by a small horse in the shafts, with six mules, three abreast, and can make a twenty days' journey. They are mostly used for the transport of beans. The oil carts are drawn by mules only, under the care of a couple of drivers, — one walking beside the team, while the other, sitting on the top of the

load, wields the whip. These teams generally make a journey of thirty or forty consecutive days, the animals resting all night in the inn yards, without shelter or clothing, under a semi-arctic climate. The commissioner confidently expects that railways, constructed to Newchwang will have their usual marked effect on trade. Newchwang is situated near the Yellow Sea, and is the most northerly port of China open to foreign trade.

—The warmest place in Europe is Malaga. *The Scottish Geographical Magazine* states that it is warmer even than the Algerian coast. The mean of the daily maxima is 66.4° F., and the month of August enjoys the tropical temperature of 80.8°, while the absolute maximum reaches 110°, and the minimum, in the exceptionally cold year of 1885, was 32°. There are only forty-eight rainy days in the year. The sugar-cane and the *cherimoya* grow in the neighborhood.

—Lieut. Ryder has given, in *Petermann's Mittheilungen* (Bd. 36, No. viii.), details of the plan he intends to follow when he leads the Danish Expedition to Greenland, as announced in *The Scottish Geographical Magazine*, vol. vi. p. 270. The coast to be explored may be divided into two stretches. The first extends from Franz Josef Fiord to Cape Brewster, latitude 70° north. Scoresby drew a map of this coast in 1822; but, the main object of his voyage being to hunt whales, he could only land twice or thrice, and did not explore the inlets which penetrate far into the land between Franz Josef Fiord and Scoresby Sound. From Cape Brewster to Angmagsalik the coast is hardly known at all: it was sighted by Scoresby in 1822, and by the French naval officer, Jules de Blosseville, in 1833. Capt. Holm draughted a map of it from sketches and information supplied by the Eskimo, from which it appears that the inland ice approaches very close to the coast, and for a considerable distance descends into the sea. The expedition is to consist of nine persons, — two naval officers, a scientist, four sailors, and probably two Greenlanders from the Danish colonies on the West Coast. They will be furnished with three boats (each 22 feet long by 6 broad), a house, sleighs, tents, fire-arms, etc. They will leave Copenhagen at the beginning of June, 1891, and endeavor to form a depot of provisions at about 69° north latitude. The ship will then sail to Cape Stewart, the south-eastern extremity of Jameson Land, which, being low and slightly undulating, is well suited for winter quarters, besides having attractions for the mineralogist, and affording opportunities to the sportsman of obtaining abundance of fresh meat. When their equipment has been landed, most of the members of the expedition will go on board again, and spend the remainder of the arctic summer in exploring the fiords between Scoresby Sound and Franz Josef Fiord, after which the vessel will return home to Denmark. During the winter, scientific observations of all kinds will be taken, and, as soon as the young ice is strong enough, short journeys will be made in sleighs around the neighboring country. In the spring, longer excursions will be made up Scoresby Sound and to the inland ice. Where possible, the velocity of the glaciers will be measured, and other observations taken which may have a bearing on the numerous questions relating to the inland ice and glacial phenomena in general. At the end of June, having left the collections they may have made to be brought away by the ship, the explorers will take to the boats and follow the coast southwards. The steamer, after taking on board the collections at Cape Stewart, will make hydrographical observations to the north of Iceland and in Denmark Strait, until the time has arrived to seek the expedition at Angmagsalik. According to Capt. Holm and the statements of the Eskimo, the heavy masses of the polar ice lie, during the end of autumn, at some distance from the coast, and therefore September has been fixed as the month in which the expedition is to be taken on board. Should, however, the vessel be unable to reach the coast, or the expedition arrive too late in the season, the explorers will have to winter at Angmagsalik, and in the summer of 1893 make their way by boat to the Danish colonies on the West Coast, whence they can take a passage home in the ships of the Königl.-gronländischen Handel. A sum of 180,000 kroner (about \$50,000) has been voted by the Danish Government for the equipment of the expedition.

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

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REVIEW OF THE WORK OF THE "PILOT CHART."

WITH the December number the eighth year of this publication begins, the first number having appeared in December, 1883. The various changes and improvements that have been made in the chart since that time are strikingly shown by a comparison between a late copy and that first issued. The most conspicuous additions are the following: steam and sailing routes; region of equatorial rains; table of barometer normals and percentage of probable calms for each 5°-square; storm diagrams, with brief rules for action to avoid a hurricane; cautionary and storm signals in use along the Atlantic and Gulf coasts of the United States; the tracks, names, and dates of derelicts; list of dangerous obstructions to navigation along the coast, and of charts published and cancelled during the preceding month; regions of observed and predicted fog. Besides these additions and other less striking ones, the greater portion of the forecast meteorologic data has been thoroughly revised, and brought up to date; while the review is now prepared with very much greater accuracy and completeness, owing to the far greater number of observers who now send in regular reports to the United States Hydrographic Office, and the hearty approbation and support received from masters of vessels of every nationality.

During the last three years, especial efforts have been made to publish promptly, and make practically useful to navigators, the results of the many reports that are made, thus giving to each and every observer the benefit of the combined experience of hundreds

of observers, and at the same time securing a wide and international circulation for data relating to the ocean. In this attempt two objects have been kept in view by the Hydrographic Office,—first, to give, in clear, practical form, as much late and important news as possible to navigators, and to aid them by every means in their power in lessening the dangers of the sea and increasing the safety and success of commerce; second, to attract the interest and attention of other classes of people to the life and duties of the officers and men of the navy and mercantile marine, and thus to insure a fair hearing and some attention and sympathy in any reasonable effort to improve the status and prospects of seafaring men and others directly interested in commerce. That these efforts have been successful to some extent, seems to be indicated by the support that their work has received from masters, owners, and agents, as well as from the public generally; and numerous quotations might be made from home and foreign reviews, and from public and private statements by recognized authorities, showing general recognition of the fact that this publication has achieved success in a new and untried field, and has been creditable to the United States. Not the least of the valuable results that have been achieved is the general recognition of the benefits to be derived from the use of oil in preventing heavy seas from breaking on board vessels,—a result universally attributed to the reports that have been published on the "Pilot Chart."

The subject of derelicts at sea, and the danger therefrom to commerce, has been emphasized in the same way; and some authorities are of the opinion that the recent marine conference owed its inception largely to the interest caused by the continued publication of such data.

A feature of the "Pilot Chart" that deserves special mention is the occasional publication of a supplement devoted to some subject of immediate importance. This plan was first tried in September, 1887; and since that time several supplements have been issued, each of which has attracted much favorable attention, and has been widely quoted. The following is a complete list of those published thus far:—

September, 1887, West Indian Hurricanes.—Diagrams and text explaining the circulation of the wind in a hurricane, with brief rules for action.

December, 1887, Transatlantic Steamship Routes for December.—The plan for steamer-routes recommended in order to avoid collisions, with a brief discussion of the winter storm-belt of the North Atlantic.

March, 1888, Water-Spouts off the Atlantic Coast of the United States during January and February, 1888.—Positions of water-spouts plotted on a small chart, with reports quoted in full, and a discussion of the subject.

August, 1888, Derelicts and Wreckage in the North Atlantic.—A history of the great log-raft, with a complete list of reports received from vessels that sighted the logs as they spread over the ocean, together with a graphic record of the drifts of the most notable derelicts.

February, 1889, The Derelict American Schooner "W. L. White."—An account of the transatlantic voyage of this notable derelict vessel, with all reports received, and a chart showing the track of the vessel and the general drift of Atlantic currents.

October, 1889, The St. Thomas-Hatteras Hurricane of Sept. 3–12, 1889.—Ten small charts, with accompanying text, illustrating the progress of this great hurricane from St. Thomas to our coast north of Hatteras, with a complete list of vessels from which reports were received in time for use in this connection.

During 1890 no supplements have been issued, but a large number of reprints in black and white have been made of the various diagrams and printed matter accompanying the chart. These have been widely circulated and republished, notably by the *New York Herald*, the *Boston Post*, and the *Liverpool Journal of Commerce*, to which papers the Hydrographic Office feel especially indebted for valuable assistance and support.

It is proposed to publish with the January chart a supplement devoted to the subject of ice in the North Atlantic during the season of 1889–90. This will contain charts showing the positions and dates of icebergs and field-ice reported during the past season (perhaps the most notable ice season on record), for which the data at

hand are very complete. Full credit will be given for every report received, and quotations will be published from reports containing information of special value.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

On the Geology of Quebec City.

THE researches of Sir William Logan, Mr. Billings, Dr. Sterry Hunt, Dr. Selwyn, Sir William Dawson, Professor James Hall, Professor Emmons, Professor Walcott, Professor Marcou, Dr. Ells, Professor Lapworth, and many others, on the geology of Quebec and its environs, have made that region classic ground to the student of North American geology. The famous Quebec group controversy, as well as its closely related friend the Taconic question in geology and the Lorraine-Hudson River problem, are all involved in the geologic history of Quebec. Much diversity of opinion has existed as to the exact geological position of some of the terranes at and about Quebec City, as also along the whole line of the great Appalachian or St. Lawrence-Champlain fault; and this is not at all astonishing, seeing that profound dislocations exist, intricate foldings of strata occur, and several terranes are met within an exceedingly small area, faulted and folded together in any thing but a simple manner, which require exceedingly detailed and careful examination before satisfactory conclusions are arrived at.

The rocks forming the citadel hill or promontory of Quebec (Cape Diamond) have been assigned to different positions in the geological scale by different writers and at different times. An elaborate review of their views is given in Dr. Ells' last report to Dr. Selwyn (1888), and published by the Geological Survey of Canada, which includes Dr. Bigsby's paper (1827), down to Professor Lapworth's report, etc., published in the "Transactions of the Royal Society of Canada" (1887). These Quebec rocks have been referred by some of the geologists above named to the age of the Quebec group (Levis division), while others, and the majority at present, regard them as newer than the Trenton limestone, viz., being of "Trenton-Utica," "Utica-Hudson," or "Lorraine" age. But before assigning a definite position to the rocks of Quebec City in the scale of terranes in America, it is necessary for the writer to state that so far he has been unable to find any evidence in the field, either stratigraphical or paleontological, whereby the Hudson River rocks and Lorraine shales as originally understood by Emmons could be correlated, and referred to the same or immediately following geologic terrane.

The fauna of the Norman's Kiln shales, that of the Marsouin, of the Tartigo River, Griffin Cove, and Gagnon's Beach rocks, as well as those from Crane Island, south-western point of the Island of Orleans, Quebec City, Etchemin Riviere (between St. Henry and St. Anselme), Drummondville, and other localities in Maine, Vermont, and New York States, form one large assemblage of forms peculiar to one terrane.

The fauna of the Lorraine shales (Cincinnati era) as characterized at Montmorency Falls, Cote Sauvageau, St. Charles Valley, Charlesbourg (near Church, two miles above St. Nicholas), Yamaska River, Riviere des Hurons, and in the undisturbed regions of Ontario (intermediate between the Utica terrane and the base of the Silurian (Upper) epoch), marks another terrane.

These two faunas, I hold, are very distinct, both in their paleontological and stratigraphical relations. The Lorraine terrane (see Dr. Selwyn's classification of formations in Canada, "Index to the Colours and Signs used by the Geological Survey of Canada") has a definite position; viz., at the summit of the Cambro-Silurian or Ordovician system. The strata at Quebec cannot be referred to the Lorraine terrane, nor to the Utica, nor yet to the Trenton or the Black River formation. Sir William Logan referred the Quebec City rocks to the Levis division of Quebec group; and yet the fauna which Mr. Weston and the

writer have, along with Mr. Giroux and L'Abbe Laflamme, been able to obtain from the rocks of that locality, contains some forty or fifty species of fossils, including graptolites, brachiopods, ostracods, and trilobites, different from Levis forms, and yet capable of being correlated with forms from a portion of the Quebec group of Logan as described in his Newfoundland section, as also with Cambro-Silurian strata in the Beccaginmic valley of New Brunswick.

To give the precise geological horizon of the strata at Quebec City, I hold, is perhaps premature. They appear, however, to occupy a position in the Ordovician system higher than the Levis formation, being probably an upward extension of that peculiar series of sedimentary strata occurring along the present St. Lawrence valley, and which, owing to the peculiar conditions of deposition and specialized fauna entombed, Sir William Logan advisedly classed together under the term "Quebec group." This would make the rocks at Quebec about equivalent to the Chazy formation of the New York and Ontario divisions.

As to the propriety of retaining the term "Hudson River" group or terrane in geologic nomenclature at present, there may be some doubt. Much confusion exists as to its use. It would very naturally follow, however, that some such designation as the "Quebec terrane" or "Quebec formation" would be most acceptable at this particular juncture, and would include those rocks which constitute the citadel and main portion of Quebec City and other synchronous strata.

In a paper which the writer is now completing for the approaching meeting of the Geological Society of America next month, on the same subject, a more detailed and exhaustive demonstration will be made of the facts now in our possession, whereby to correlate many series of strata hitherto separated, and differentiate others which are by nature unlike.

HENRY M. AMI.

Geological Survey of Canada, Ottawa, Nov. 28.

The Education of the Deaf.

POSITIVE evidence is all the world over regarded as of more value than negative testimony; and any one desirous may convince himself that congenital deaf-mutes can be taught to use spoken language correctly by articulation and by writing, without the intervention of any artificial signs, by a pilgrimage to the Institution for the Improved Instruction of Deaf-Mutes, corner of 67th Street and Lexington Avenue, this city; the Clark Institution for the Deaf at Northampton, Mass.; or the Day School for the Deaf, Boston, Mass. Any unbiased individual will come away from such a visit with the firm conviction that some teachers for the deaf have been for the last seventy years working great detriment to the elevation of an unfortunate class of our fellow-beings by preaching the fallacious and utterly untenable doctrine that such an education is an impossibility, and impracticable if possible.

B. ENGELSMAN.

New York, Dec. 2.

BOOK-REVIEWS.

Are the Effects of Use and Disuse Inherited? An Examination of the View held by Spencer and Darwin. By WILLIAM PLATT BALL. London and New York, Macmillan. 8°.

THIS book is ultra neo-Darwinistic. Natural selection has achieved every thing, according to the author: the effects of use and disuse are not inherited. "Innumerable modifications in accordance with altered use or disuse, such as the enlarged udders of cows and goats, and the diminished lungs and livers in highly bred animals that take little exercise, can be readily and fully explained as depending on selection. As the fittest for the natural or artificial requirements will be favored, natural or artificial selection may easily enlarge organs that are increasingly used, and economize in those that are less needed. I therefore see no necessity whatever for calling in the aid of use-inheritance, as Darwin does, to account for enlarged udders, or diminished lungs, or the thick arms and thin legs of canoe Indians, or the enlarged chests of mountaineers, or the diminished eyes of moles, or the lost feet of certain beetles, or the reduced wings of logger-headed ducks, or

the prehensile tails of monkeys, or the displaced eyes of soles, or the altered number of teeth in plaice, or the increased fertility of domesticated animals, or the shortened legs and snouts of pigs, or the shortened intestines of tame rabbits, or the lengthened intestines of domestic cats" (pp. 82, 83).

Again: "The inferiority of Europeans, in comparison with savages, in eyesight and in the other senses, is attributed to 'the accumulated and transmitted effect of lessened use during many generations.' But why may we not attribute it to the slackened and diverted action of the natural selection which keeps the senses so keen in some savage races?" (p. 85).

These examples are sufficient to show what standpoint the author takes.

Higher Education of Women in Europe. By HELENE LANGE, Berlin. Tr. by L. R. Klemm. New York, Appleton 12°. \$1.25.

WOMEN in Germany, as our readers probably know, are practically excluded from the higher education, and are sparingly employed as teachers even in girls' schools, Germany being in this respect far behind England and America. It is not surprising, therefore, that a book like this should appear from a German woman, pleading the cause of her countrywomen with earnestness and love. It is, moreover, a work of real ability, showing not only a clear conception of what is wanted, but also an equally clear comprehension of the difficulties in the way. The book opens with an account of the provisions recently made for woman's higher education in England, of which the authoress speaks with much enthusiasm. She then touches lightly on women's schools in other European countries, and shows, that, of all nations claiming to be civilized, Germany has done the least for the higher education of its women. In short, no provision whatever is made for it, so that "the German women have to go to foreign countries if they will not forego a higher education."

The argument for giving women access to a university training is based in the main on these two considerations,—that many women need it in order to gain a living by professional work, and that women whose circumstances raise them above want need the means of developing their higher natures, thus enabling them to be more useful in the position they hold. These arguments and others that the authoress uses are familiar to Americans, and it is surprising and almost disgusting to read of the bitter, and we must say unmanly, opposition to women's education that is shown by the men of Germany. It is based on the same considerations that were formerly adduced in England and America, with the addition of the sordid plea, that, if women are admitted to the higher education, men will suffer from their competition in the professions. These arguments are all set aside by the able and temperate discussion in this book, which all persons interested in the subject will like to read. Nothing is said in the original work about women's education in America; but the translator's introduction contains some statistics and other matter relating to the subject, showing how rapid has been its progress in recent years.

Longmans' School Geography for North America. By G. G. CHISHOLM and C. H. LEETE. New York, Longmans, Green, & Co. 12°. \$1.25.

Handbook of Commercial Geography. By G. G. CHISHOLM. New York, Longmans, Green, & Co. 8°.

A Smaller Commercial Geography. By G. G. CHISHOLM. New York, Longmans, Green, & Co. 12°. 90 cents.

The well-known London publishing-house of Longmans Green, & Co. have recently brought out several books on geography to which our particular attention is called. Thornton's "Physiographies" have already been mentioned in our columns. Chisholm's "Geographies" are now before us. First comes a general work, entitled "Longmans' School Geography for North America," made over for use in this country from an English edition by Leete. Its peculiar features are, first, the octavo form, from which all maps are omitted, these to be supplied later in "Longmans' new Atlas," an American edition being now in preparation; second, the omission of special accounts of our various States, the whole country being first described in general as to its physical features,

and then reviewed by districts with much critical perception of significant geographical details. A good deal of repetition from State to State is thus saved, and the use of such a book might have a real political significance in impressing the essential unity of the country on the minds of the scholars. It may also be said that the explanation of the causes that have led to the locations of cities constitutes a feature of the book, and in many cases an interesting one. The physical introduction in the first sixty pages is not so satisfactory as the rest of the book, being too crowded, and lacking home illustration, this part having no appearance of special adaptation to our schools. The illustrations are generally taken from photographs, and are well selected; but some are not as fresh and sharp-cut as we could wish. The author rightly lays emphasis on the omission of all questions at the end of chapters, and on the avoidance of the paragraph style, which so often results in memorizing instead of in learning. Considering the excellence of our own school geographies, it is a somewhat hazardous experiment for a foreign house to compete with our publishers, and we shall watch with interest to see how far this one of its products finds favor here.

Chisholm has also prepared a "Handbook of Commercial Geography" and a "Smaller Commercial Geography." These are written for English readers without re-editing for this country; but they deserve a welcome from those of our teachers who have the skill to lead their scholars to read outside of their regular text-books. In the present crowded condition of the studies of all our common schools, it is difficult to imagine where time could be found for commercial geography, unless as side-reading; and for this purpose either of the above books may be highly recommended for school libraries. Commercial and business colleges might use them to great advantage as regular text-books. The introductory chapter on commodities and the circumstances which affect their production and carriage will certainly hold the attention of young people, to whom geography has been presented as a live study. The rest of the books is more statistical than is compatible with attractive interest, but it would be a valuable aid in answering the questions that properly taught scholars must often ask.

Warren's New Physical Geography. By W. H. BREWER. Philadelphia, Cowperthwait. 1°.

A NEW edition of "Warren's Physical Geography" has been prepared by Professor W. H. Brewer of Yale University. It retains the atlas form so generally used for books of this class, and divides its chapters into short paragraphs directly prepared for the scholars' use, and followed by questions for the teacher. The chief divisions of the book are, the earth as a planet, chemical and geological history of the earth, the land, the water, the atmosphere, organic life, and the United States. The illustrations are generally good, although a greater number of designs appear than is desirable in these days of photographs. The double-page Mercator charts are distinctly printed and colored, showing the conventional series of facts, volcanoes and earthquakes, heights of land and depths of sea, drainage and winds, ocean currents, rainfall, and annual isotherms. The imitation bas-reliefs of the continents are clearly printed, and give only too emphatic an idea of the mountain ranges. The statements of the text are evidently carefully considered, and brought down to date; and we believe that the book as a whole must give satisfaction to those who are satisfied to use any book on physical geography now in existence.

The questions that a review of this work raises do not refer particularly to the book itself, but to its class. If we bear in mind the general quality of the scholars who are to use it, and their easy contentment with facts presented in a direct manner, and also consider the busy life of the teachers, who have no time, or at best very little, to give to the personal teaching that idealists in education desire, then the book must be regarded as satisfactory; but if we consider the intellectual growth of the scholar, and his individual development and training, it may be doubted if any book of this kind can be regarded with approval, because of the necessarily great condensation in the treatment of its varied subjects. Professor Brewer has skilfully avoided as much of this difficulty as any one could; his paragraphs are unusually clear, although

there is occasionally a lapse in this respect; and his statements are manifestly made only after much study and preparation, for it is seldom that there is any reason for criticism on the ground of inaccuracy. It is hardly to be expected that any general text book shall be free from slips of one kind or another, and the agents of rival publishing-houses will always have their opportunity of picking up little flaws and magnifying them before school superintendents. We do not intend to aid these agents by mentioning any little errors here discovered; but it is allowable to wonder why this and all other text-books fail to explain difference of latitude as the angle between the horizons at two places on a meridian, why they always fail in explaining the low atmospheric pressure around the poles, why they speak of mountains and valleys as the "eventual" forms to which erosion will reduce the land.

The publishers call particular attention to the revision of the chapter on the atmosphere; and it certainly deserves commendation. A very rational understanding of the phenomena on which climate and weather depend may be gained from it; and this is much more than could be said of the older books. The chief omission here is one that prevails through the whole book,—the absence of any indication or suggestion that the scholar can find out many of these things for himself. A physical geography in which this idea was the main theme would be welcomed by many teachers.

The Life of John Ericsson. By WILLIAM CONANT CHURCH. Vols. I. and II. New York, Scribner. 8°. \$6.

THE author has presented this work on the life of the great inventor in a clear, readable manner, and has shown excellent judgment and a remarkable insight into the character and scientific attainments of John Ericsson.

There is one fact that must impress itself upon those who read these volumes; and that is, that in the life's work of the man one can trace step by step the development of the steam-engine, almost from its very beginning, to these days when its power is felt all over the world. Even the matter of forced draught, which is one of the vexed questions of the day, we find was considered in his early plans for steam-machinery. Naval construction and naval warfare were revolutionized by the introduction of the screw propeller, which the author shows beyond question to have been due to the genius of Ericsson, from whose engines, introduced almost half a century ago, have gradually grown the magnificent machinery which moves immense hulls about the ocean at a rate of speed that fully bears out prognostications made years before others could realize that they were any thing more than the dreams of an enthusiast. Of all Ericsson's inventions, the one most closely connected with his memory in the minds of Americans will always be the "Monitor." The idea of this war-vessel appealed at once to the minds of the naval authorities, whose prompt and spirited action was followed by a great display of energy on the part of the builders; so that, "while the clerks of the department were engaged in drawing up the formal contract, the iron which now forms the keel-plate of the 'Monitor' was drawn through the rolling-mill." It has been estimated that the new vessel contained at least forty patentable contrivances; and Ericsson was again and again urged to secure patents for these, but, without avail. "He was strangely neglectful all through life of this means of protecting his property rights. Numerous as were his patents, they by no means represented the full measure of his ingenuity, and many of them were taken out to secure for himself, as well as for others, the right to use his own inventions." It was Ericsson's habit to wait until he was ready to present his engineering conceptions in practical form before announcing them. Thus they had opportunity to ripen in his mind, and to gain in clearness and completeness with growing experience. The conception of the "Monitor" as part of his mental history was nearly half a century old when it was put into execution to meet the exigencies of war.

In demonstrating the efficiency of his method of under-water torpedo attack, he said, "My only object is that of seeing the sea declared by all nations as sacred neutral ground. It is the highway of mankind." He also declared the art of war to be in its

infancy. "When perfected, man will be forced to live in peace with man. This glorious result, which has been the cherished dream of my life, will unquestionably be attained before the close of the present century."

Aside from his contributions to the practical part of warfare, which, collateral and incidental, were many, and are to-day showing how far from being visionary and impracticable he was, Ericsson went deeply into the scientific questions bearing upon radiant energy, thermo-dynamics, light, and heat. His various devices for a caloric engine occupied a great deal of his attention throughout his professional career, and its development was naturally associated with inquiries as to the nature of solar energy, and the possibility of its direct application to the purposes of human industry. He resolved, as he said, to measure for himself "the intensity of that big fire which is hot enough to work engines at a distance of 90,000,000 miles." Toward the close of his life, in writing to a friend, he says, "The sun-motor is nearer perfection than the steam-engine; but until the coal-mines are exhausted its value will not be fully acknowledged." As the present study of solar physics dates from only thirty years ago, Ericsson is one of the pioneers in this field so fruitful in its promise of great revelations, and "he is certain to be remembered as one who did much to stimulate and direct inquiry in this most important field of physical research."

Of his friendships his biographer says, "He was as true to his friends as he was charitable and forgiving toward those who had done him injustice or positive wrong. He was full of kindly feeling, and was always ready to stretch forth his hand to those in need of his service." He was utterly unostentatious in his many charities; and what he did was done with his whole heart, and he added to the gift the grace of cheerful giving. Col. Church thinks that "whatever the final determination as to the correctness of some of Ericsson's conclusions, it cannot be questioned that he has made very important contributions to science." The work is an undoubted addition to literature, is rendered attractive by numerous and well selected illustrations, and contains an index of great completeness.

AMONG THE PUBLISHERS.

LAST spring appeared a little volume entitled "An Appeal to Pharaoh: a Radical Solution of the Negro Problem." The steadily growing demand has determined the publishers (Fords, Howard, & Hulbert of New York) to issue an edition in paper covers, and to announce the name of the author, who is Mr. Carlyle McKinley, an editorial writer on the *Charleston (S.C.) News and Courier*.

—Mr. Daniel Greenleaf Thompson has written an elaborate essay on "The Philosophy of Fiction in Literature," in which the principles of the novelist's art are examined in detail, while especial attention is paid to the consideration of the moral aspects of the novel, and of its influence for good or evil. The book will be published shortly by Longmans, Green, & Co.

—The Pacific district comprises California, Oregon, Washington, and Nevada; but in "Land Birds of the Pacific District," by Lyman Belding (San Francisco, California Academy of Sciences), the district of British Columbia, and the notes of the lighthouse-keepers on the coast of British Columbia and Washington, are included. "This report aims mainly to show the arrivals and departures of migrating species, as well as to give a catalogue of all the species known to occur in the district." The number of species recorded is 295. It is an important contribution to the geographical distribution of the land-birds of the Pacific coast.

—The fourth volume of "The Century Dictionary" has just been issued, containing the letters *M* to *P* inclusive, and forming a quarto of 1,323 pages, illustrated by nearly 1,500 cuts. The first volume was issued in October, 1889; the fourth has followed in November, 1890 (almost within a year); and the other two volumes, completing the work, will be published during 1891,—the first early in the year, and the second probably by summer. The present volume is the largest of the series yet published. With

each successive instalment of the dictionary it has become more and more clear that the original estimates were too small, both as regards the total of pages in the completed book and the wealth of words and other lexicographical material which it would contain. The number 6,500, which was announced as the limit for the pages, must be increased to at least 7,000, and the number of words defined will be considerably in excess of the 200,000 at first promised: for the words contained in the first four volumes now published (two-thirds of the work, 4,880 pages) are in round numbers 152,000; and, if we may suppose that the same fulness will characterize the letters remaining to be treated, the total cannot fall far short of 225,000. An examination of the vocabulary of "The Century Dictionary" will show that only those words, derivatives, and compounds are admitted which have an established place in the language or require definition. Had the editors not been conservative in this particular, their list would doubtless have been increased to 250,000 words. The fourth volume illustrates the technical and scientific character of the dictionary. Beginning with the letter *M*, one meets the prefix *macro-*, followed in quick succession by *meso-*, *meta-*, *micro-*, *mono-*, and many others of greater or less importance, from which are formed groups of hundreds of technical terms, most of which have come into existence during the last ten or fifteen years. The same is true of the other letters, especially of *P*, which, indeed, owes its size (660 pages) very largely to this wealth of scientific material. The treatment of technical words, too, is on a broad scale in this volume, as is well illustrated by the definitions of *magnesia*, *magnet* (and its derivatives), *mammalia*, *man* (in its etymology), *marble*, *metamorphism*, *meter*, *microscope*, *mirror*, *mode* (in its musical sense), *muscle*, *nervation*, *operation*, *opening* (in chess), *orchestra*, *Orchideæ*, *pianoforte*, etc. The same fulness marks the definitions of common names of animals and plants, as of *mackerel*, *mildev*, *minnow*, *partridge*, *pine*, etc. "The Century Dictionary" is first a dictionary of the English language, and after that an encyclo-

pedic dictionary. Take, for example, the common English word *put*. It occupies seven columns of the dictionary, and its treatment includes 17 definitions and 169 special phrases, which are illustrated by 190 quotations ranging from the earliest period of English literature to the present day, the definitions and quotations together exhibiting the word in every important phase of its idiomatic use. This treatment of *put*, liberal as it is, is in no sense encyclopedic, but is strictly lexicographic, being necessitated by an attempt really and thoroughly to define the word. It simply shows what an amount of information about common words the editors of "The Century Dictionary" are bringing to light. The facts thus exhibited by the word *put* are perhaps even more strikingly shown by *make*, with 83 definitions, 159 phrases, and 126 quotations, and by *pass*, with 72 definitions, 30 phrases, and 127 quotations. These, of course, are among the most striking instances of the kind; but what is true of them is true on a smaller scale of the treatment of nearly every common word in the volume. The book abounds not only with fresh discussions of old words, and new definitions of familiar words illustrated by apt quotations, but also with words which have been in the literature of the language for perhaps scores of years, but which are new in the sense that no dictionary has before recorded them. There are many illustrations of special interest in this fourth volume.

—A seasonable subject is discussed by Dr. William H. Flint in his article on "Children's Coughs," in the December number of *Babyhood*. The writer divides all coughs into harmless and serious ones, and gives many hints which will enable mothers to distinguish one class from the other. Dr. Yale, the medical editor, furnishes an article on "What may be done to prevent Diphtheria."

—In the second volume of the Science in Plain Language Series, William Durham of the Royal Society of Edinburgh writes interestingly on the general subject of astronomy, describing in

Publications received at Editor's Office, Nov.
10-22.

SCUDDER, H. E. *Fables and Folk Stories*. Part I. Boston and New York, Houghton, Mifflin, & Co. 96 p. 16°. 15 cents.

SIME, J. *Geography of Europe*. London and New York, Macmillan. 341 p. 16°. 80 cents.

SOCIOLOGY. *Popular Lectures and Discussions before the Brooklyn Ethical Association*. Boston, J. H. West. 403 p. 12°. \$2.

U. S. GEOLOGICAL SURVEY. *Topographical Maps of Portions of Massachusetts, New Hampshire, Vermont, Montana, New York, Virginia, Maryland, California, Arkansas, Indian Territory, New Mexico, Missouri, Georgia, Texas, Illinois, North Carolina, Iowa, Pennsylvania, Alabama, New Jersey, West Virginia, Rhode Island, Maine, Colorado, Wisconsin, Kansas, and Connecticut*. Washington, Government, 1890. 62 maps, 42 by 50.5 cm.

WOODWARD, C. M. *Manual Training in Education*. New York, Scribner & Welford. 310 p. 12°. \$1.25.

READY IN JANUARY.

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plain language some of the principal facts and speculations connected with that science. The plan of the work is similar to that which proved so successful in the first volume of the series, in which the same author treated of evolution and kindred subjects. In separate articles, each complete in itself yet closely connected to the others, the author deals successively with the sun and moon, the earth, the stars and nebulae, and the planets; adding some speculations on the formation of the heavenly bodies and the contents of space, and concluding with a brief chapter on the tides, light, and the spectroscope. This series of handy volumes is published by Black of Edinburgh, and in this country by Macmillan.

— Mr. Nicholas P. Gilman, author of "Profit-Sharing between Employer and Employee," has in preparation a new volume, to be entitled "Socialism and the American Spirit." It will comprise chapters on the re-action against individualism; recent American socialism; the American social idea in practice as distinguished from individualism and socialism; the field for social reform in America; arbitration, industrial partnership, and co-operative production, considered as steps out of labor troubles; recent progress in profit-sharing; the first duty of the educated classes; the way to Utopia; etc.

— Messrs. Henry Holt & Co. will publish in January the first number of a new monthly, *Educational Review*, of which Professor Nicholas Murray Butler of Columbia, who is president of the New York College for the Training of Teachers, will be editor-in-chief; and associated with him will be Dr. E. H. Cook, head master of Rutgers Preparatory School, New Brunswick, N. J.; Dr. William H. Maxwell, superintendent of schools in Brooklyn; and Dr. A. B. Poland, superintendent of schools in Jersey City. This gives the university, the preparatory school, and the public school representatives on the editorial board. The character of the publication may be further inferred from the fact that the circular announcing

it contains the indorsements of the presidents of Harvard, Yale, Johns Hopkins, Columbia, Massachusetts Institute of Technology, Cornell, University of Michigan, and some hundred educators of corresponding prominence. Probably no equally promising attempt at an educational periodical has ever before been made in America, if anywhere.

— The J. G. Cupples Company of Boston will soon issue a holiday book entitled "Aunt's Elfin Land." It is a collection of fairy-stories, or, rather, the combined histories of three children who had most strange adventures in the land of "the little folk." They are written by Mrs. Maria Hildreth Parker, and are illustrated by Hermann D. Murphy.

— In the December number of the *Magazine of American History* the opening paper is an historical sketch of the rise and fall and characteristics of the ancient town of Fort Benton, in Montana, with illustrated accounts of early navigation of the upper Missouri River. The second contribution is "David Hartley and the American Colonies," by Joseph W. Hartley of New York. A portrait of David Hartley, England's signer of the definitive treaty of peace with America, forms the frontispiece to the magazine. Following these articles are "The Institution of Thanksgiving Day, 1623," by Jacob Harris Patton, A. M.; "La Salle's Homestead at Lachine," by John Fraser of Montreal; "A Typical Old-Time Minister, the Reverend Benjamin Tappan," by Rev. D. F. Lamson; "Glimpses of Early Michigan Life in and about Kalamazoo," by Mary V. Gibbs; "Our Old Webster's Spelling-Book," by Rev. A. M. Colton; and "Some Literary Statesmen," which brings into view facts in relation to eminent writers in the councils of the nation, by Milton T. Adkins. Shorter articles are "President Garfield's Silent Journey," "Mrs. Elizabeth B. Custer surrounded by Buffaloes, or Camp Life in Kansas Twenty Years Ago," "A Cluster of Christmas Poems for the Household," and some hitherto unpublished letters.

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CALENDAR OF SOCIETIES.

Biological Society, Washington.

Nov. 30.—T. H. Bean, The Death of Salmon after Spawning; Theobald Smith, On Species among Bacteria; G. B. Sudworth, Notes on Nomenclature; F. A. Lucas, The Wing of Metopidius.

Boston Society of Natural History.

Dec. 3.—J. Walter Fewkes, The Summer Ceremonials of the Zuñi Indians: a Study of Aboriginal Religion (illustrated by the stereopticon).

Wants.

Any person seeking a position for which he is qualified by his scientific attainments, or any person seeking some one to fill a position of this character, be it that of a teacher of science, chemist, draughtsman, or what not, may have the 'Want' inserted under this head FREE OF COST, if he satisfies the publisher of the suitable character of his application. Any person seeking information on any scientific question, the address of any scientific man, or who can in any way use this column for a purpose consonant with the nature of the paper, is cordially invited to do so.

WANTED.—An Exploring Expedition, backed by \$15,000, will be sent into Alaska and the British Northwest Territory the coming year, to be gone one or two seasons. A scientist or two will more than likely be taken along. Applications from such will be gladly received and carefully considered. To assist in making these applications the commander would say that he considers a full practical knowledge of mineralogy and geology necessary, and if the applicant can add the duties of botanist, ethnologist, or any other of the sciences, and photography, sketching, medicine and surgery, or other useful arts for exploring, it will add to the chances of being selected. Applicants must be physically perfect, and ought to be about medium age. One of these scientists will be the second in command of the party. Any credentials forwarded for consideration will be returned, if requested, after consideration. Address "ALASKA," care of *Science*.

WANTED.—There being a considerable annual income for the purchase of books for the Museum Reference Library of Iowa College, it is desirable to have at hand any and all circulars, specimen sheets, catalogues, etc., of all works on Natural History in general, both foreign and domestic. Circulars of museum supplies, apparatus, etc., etc., desired also. State terms. Address ERWIN H. BARBOUR, Box 1333, Grinnell, Iowa.

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COULD some one inform me what the ingredients and origin of asphalt as used for street-paving, and gathered at Trinidad are? Also how gathered and shipped by natives, and mode of refining by the Warren-Scharf Co. of New York and the Barber Co. of Washington? G. KNIPER, 28 Gunn Block, Grand Rapids, Mich.

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